

HW #10 - due Fri, 10/2

5.7 #35-75 odd Solving equations by factoring

HW #11 - due Mon, 10/5

6.1 #39-79 odd Simplifying rational expressions

HW #12 - due Fri, 10/8

6.2 #3-95 odd Operations on rational expressions

6.6 #5-25 odd Literal Equations

HW #13 - due Wed, 10/14

7.1 #39-73 odd, 85-113 odd, 125-149 odd

HW #14 - due Fri, 10/16

7.2 #11-21 odd, 43-51 odd, 57-65 odd,  
85-91 odd, 97-103 odd, 113-121 odd

8.2 #59-69 odd

HW #15 - due Mon, 10/19

6.3 #17, 23, 25, 33, 41, 43

6.4 #9-31 odd

Test #4 - Tues, 10/20

Rational Exponents and Radical Expressions

Operations on Radical Expressions

Quadratic Equations

Complex Fractions

Rational Equations

$$\begin{aligned}
 40. \quad & 1 - \frac{1}{\left(1 - \frac{1}{b-2}\right)} = 1 - \frac{1}{\frac{1}{1} \frac{b-2}{b-2} - \frac{1}{b-2}} \\
 & = 1 - \frac{1}{\left(\frac{b-2-1}{b-2}\right)} = 1 - \frac{1}{\left(\frac{b-3}{b-2}\right)} \\
 & = 1 - 1 \cdot \frac{b-2}{b-3} \\
 & = 1 \cdot \frac{b-3}{b-3} - \frac{b-2}{b-3} = \frac{b-3-(b-2)}{b-3} \\
 & = \frac{-1}{b-3}, \quad b \neq 3, 2
 \end{aligned}$$

$$\begin{aligned}
 44. \quad a - \frac{1}{\left(2 - \frac{2}{\left(2 - \frac{2}{a}\right)}\right)} &= a - \frac{1}{\left(2 - \frac{2}{\left(\frac{2a}{a} - \frac{2}{a}\right)}\right)} \\
 &= a - \frac{1}{\left(2 - \frac{2 \cdot 1}{\left(\frac{2a-2}{a}\right)}\right)} = a - \frac{1}{\left(2 - \frac{2}{1} \cdot \frac{a}{2a-2}\right)} \\
 &= a - \frac{1}{\left(2 - \frac{2 \cdot a}{1 \cdot 2(a-1)}\right)} = a - \frac{1}{\left(\frac{2}{1} - \frac{a}{a-1}\right)} \\
 &= a - \frac{1}{\left(\frac{2(a-1)}{1} - \frac{a}{a-1}\right)} = a - \frac{1}{\left(\frac{2a-2-a}{a-1}\right)} \\
 &= a - \frac{1}{\left(\frac{a-2}{a-1}\right)} = a - \left[ \frac{1 \cdot a-1}{a-2} \right] \\
 &= \frac{a(a-2)}{1 \cdot a-2} - \frac{a-1}{a-2} = \frac{a^2-2a-(a-1)}{a-2} = \\
 &= \boxed{\frac{a^2-3a+1}{a-2}, a \neq 2, 1, 0}
 \end{aligned}$$

### 6.4 Rational Equations

$$14. \quad \frac{5}{x} = \frac{2}{x+3}$$

$$\frac{\cancel{x}(x+3)}{1} \cdot \frac{5}{\cancel{x}} = \frac{2}{\cancel{x+3}} \cdot \frac{\cancel{x}(x+3)}{1}$$

$$5(x+3) = 2x$$

$$5x+15 = 2x$$

$$3x = -15$$

$$\boxed{x = -5}$$

$$22. \quad \frac{3x}{1} = \frac{4}{x} - \frac{13}{2}$$

$$\frac{2x}{1} \cdot \frac{3x}{1} = \frac{2x}{1} \left[ \frac{4}{x} - \frac{13}{2} \right]$$

$$6x^2 = \frac{2x}{1} \cdot \frac{4}{x} - \frac{2x}{1} \cdot \frac{13}{2}$$

$$6x^2 = 8 - 13x$$

$$6x^2 + 13x - 8 = 0$$

$$\underbrace{6x^2 - 3x + 16x - 8}_{(2x-1)(3x+8)} = 0$$

$$3x(2x-1) + 8(2x-1) = 0$$

$$(2x-1)(3x+8) = 0$$

$$\boxed{x = \frac{1}{2} \quad x = -\frac{8}{3}}$$

$$26. \quad \frac{x}{x-2} = \frac{3}{x-4}$$

$$x(x-4) = 3(x-2)$$

$$x^2 - 4x = 3x - 6$$

$$x^2 - 7x + 6 = 0$$

$$(x-6)(x-1) = 0$$

$$\boxed{x = 6, x = 1}$$

$$30. \quad \frac{5}{x-2} - \frac{2}{x+2} = \frac{3}{x^2-4}$$

$(x-2)(x+2)$

$$\frac{(x-2)(x+2)}{1} \cdot \left[ \frac{5}{x-2} - \frac{2}{x+2} \right] = \frac{3}{(x-2)(x+2)} \cdot \frac{(x-2)(x+2)}{1}$$

$$5(x+2) - 2(x-2) = 3$$

$$5x + 10 - 2x + 4 = 3$$

$$3x = -11 \quad \begin{array}{r} -4 \\ -10 \end{array} \quad \begin{array}{r} -4 \\ -10 \end{array}$$

$$x = -\frac{11}{3}$$

$$32. \quad \frac{9}{x^2+7x+10} = \frac{5}{x+2} - \frac{3}{x+5}$$

$(x+5)(x+2)$

$$\frac{(x+5)(x+2)}{1} \cdot \frac{9}{(x+5)(x+2)} = \frac{(x+5)(x+2)}{1} \left[ \frac{5}{x+2} - \frac{3}{x+5} \right]$$

$$9 = 5(x+5) - 3(x+2)$$

$$9 = 5x + 25 - 3x - 6$$

$$-10 = 2x$$

~~$$-5 = x$$~~

no solution

Simplifying Rational Expressions

- Factor first
- In order to add or subtract, find least common denominator and multiply each term by 1, in the form of each missing factor over itself
- LCD is not necessary to multiply or divide fractions
- Dividing by a fraction is the same as multiplying by its reciprocal
- Like factors in numerator and denominator can cancel only when everything is multiplied
- List values excluded from domain

Solving Rational Equations

- Determine least common denominator, and multiply both whole sides of the equation by that LCD in order to eliminate fractions
- Remember to check solutions to see if they make the original problem undefined

Simplify and state the values which are not in the domain for each variable.

$$1. \quad \frac{-36x^2 - 48x}{18x^3 + 24x^2} = \frac{-12x(3x+4)}{6x^2(3x+4)}$$
$$= \boxed{\frac{-2}{x}, x \neq 0, -\frac{4}{3}}$$

$$\begin{aligned} 2. \quad & \frac{x^2 + x - 6}{3x^2 - 10x + 8} \\ &= \frac{(x+3)(\cancel{x-2})}{(\cancel{x-2})(3x-4)} \\ &= \boxed{\frac{x+3}{3x-4}, x \neq 2, \frac{4}{3}} \end{aligned}$$

$$\begin{aligned} & 3x^2 - 6x - 4x + 8 \\ & 3x(x-2) - 4(x-2) \\ & (x-2)(3x-4) \end{aligned}$$